

Appl. No. 10/789093

In the Claims:

Listing of all claims:

- 1 1. (Original) A method of MIG welding
2 comprising:
3 providing ac power to a weld, wherein the ac power
4 has a negative portion and a positive portion, and the ac
5 power further has a frequency;
6 wherein the negative portion is greater than the
7 positive portion;
8 wherein the frequency is at least 60 Hz.

- 1 2. (Original) The method of claim 1, wherein the
2 frequency is between 90 Hz and 120 Hz.

- 1 3. (Original) The method of claim 1, further
2 including providing a consumable, flux-cored, wire to the weld.

- 1 4. (Original) The method of claim 1, further
2 including providing a consumable, metal-cored, wire to the weld.

- 1 5. (Original) The method of Claim 4, wherein
2 providing the wire includes providing a wire wherein the wire
3 comprises a sheath encapsulating a core having a core
4 composition, the core composition comprising a combination of
5 graphite and one or more compounds of potassium, the combination
6 of graphite and compounds of potassium in the core composition
7 not exceeding approximately 5% by weight.

- 1 6. (Original) The method of Claim 5, wherein
2 providing the wire includes providing the wire electrode wherein
3 the one or more compounds of potassium comprise K_2MnTiO_6 .

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1 7. (Previously Presented) The method of Claim 6,
2 wherein providing includes providing the wire wherein the
3 combination is selected from the range from about 0.3% to about
4 5.0% by weight.

1 8. (Original) The method of claim 1, further
2 comprising providing a weld path on at least one workpiece,
3 wherein the weld path includes a groove having an angle of less
4 than 50 degrees.

1 9. (Original) The method of claim 1, further
2 comprising providing a weld path on at least one workpiece,
3 wherein the weld path includes a groove having an angle of less
4 than 30 degrees.

1 10. (Original) The method of claim 1, further
2 comprising providing a weld path on at least one workpiece,
3 wherein the weld path includes a groove having an angle of
4 between 20 degrees and 30 degrees.

1 11. (Original) The method of claim 1, including
2 welding at a rate of at least 35 pounds per hour using a single
3 arc.

1 12. (Original) The method of claim 11 including
2 welding at a rate of at least 40 pounds per hour.

1 13. (Original) The method of claim 11 wherein the
2 negative portion is at least twice the positive portion.

1 14. (Original) The method of claim 10 wherein the
2 negative portion is at least 1.5 times the positive portion.

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1 15. (Original) The method of claim 1 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.5 seconds.

1 16. (Original) The method of claim 14 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.75 seconds.

1 17. (Original) The method of claim 1 further
2 including providing a stick-out of about 2 inches.

1 18. (Original) The method of claim 17 further
2 comprising providing a shielding gas at a rate of at least 80
3 cubic feet per hour.

1 19. (Currently Amended) A method of MIG welding
2 comprising:

3 providing ac power to a weld, wherein the ac power
4 has a negative portion and a positive portion, and the ac
5 power further has a frequency of between 30 Hz and 120 Hz;
6 and

7 providing at least one workpiece with a weld path
8 thereon, wherein the weld path includes a groove having an
9 angle of less than 50 degrees.

1 20. (Original) The method of claim 19, wherein
2 providing at least one workpiece includes providing the weld path
3 with the groove having the angle between 20 degrees and 30
4 degrees.

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1 21. (Original) The method of claim 19, wherein
2 providing at least one workpiece includes providing the weld path
3 with the groove having the angle less than 30 degrees.

1 22. (Original) The method of Claim 21, further
2 comprising providing a wire comprising a sheath encapsulating a
3 core having a core composition, the core composition comprising a
4 combination of graphite and one or more compounds of potassium,
5 the combination of graphite and compounds of potassium in the
6 core composition not exceeding approximately 5% by weight.

1 23. (Original) The method of Claim 22, wherein
2 providing the wire includes providing the wire electrode wherein
3 the one or more compounds of potassium comprise K_2MnTiO_4 , and the
4 combination is selected from the range from about 0.3% to about
5 5.0% by weight.

1 24. (Original) The method of claim 21 wherein:
2 the negative portion is greater than the positive
3 portion; and
4 the negative portion is at least 1.5 times the positive
5 portion.

1 25. (Original) The method of claim 24, wherein
2 the frequency is between 90 Hz and 120 Hz.

1 26. (Original) The method of claim 24, further
2 including providing a consumable, metal-cored, wire to the weld.

1 27. (Original) The method of Claim 24, further
2 comprising providing a wire comprising a sheath encapsulating a
3 core having a core composition, the core composition comprising a
4 combination of graphite and one or more compounds of potassium,

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5 the combination of graphite and compounds of potassium in the
6 core composition not exceeding approximately 5% by weight.

1 28. (Original) The method of Claim 27, wherein
2 providing the wire includes providing the wire electrode wherein
3 the one or more compounds of potassium comprise K_2MnTiO_4 , and the
4 combination is selected from the range from about 0.3% to about
5 5.0% by weight.

1 29. (Currently Amended) A method of MIG welding
2 comprising:

3 providing ac power to a weld having a negative
4 portion and a positive portion, and the ac power further
5 having a frequency of between 30 Hz and 120Hz; and

6 providing a consumable, cored, wire to the weld.

1 30. (Original) The method of claim 29 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.5 seconds.

1 31. (Original) The method of claim 29 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.75 seconds.

32-38. (Cancelled.)

1 39. (Currently Amended) A method of MIG welding
2 comprising:

3 providing ac power to a weld having a negative
4 portion and a positive portion, and the ac power further
5 having a frequency between 30 Hz and 120 Hz; and
6 wherein the negative portion is at least 1.5 times
7 the positive portion.

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1 40. (Original) The method of claim 39 wherein the
2 duration of the negative portion is at least 1.5 times the
3 duration of the positive portion.

1 41. (Original) The method of claim 39 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.5 seconds.

4 42. (Original) The method of claim 39 wherein the
5 weld process begins with a first negative portion having a
6 duration of at least 0.75 seconds.

1 43. (Currently Amended) A method of MIG welding
2 comprising:

3 providing ac power to a weld, wherein the ac power
4 has a negative portion and a positive portion, and the ac
5 power further has a frequency between 30 Hz and 120Hz;

6 wherein the negative portion is greater than the
7 positive portion; and

8 wherein the weld process begins with the negative
9 portion of at least 0.5 seconds duration.

1 44. (Original) The method of claim 43 wherein the
2 weld process begins with a first negative portion having a
3 duration of at least 0.75 seconds.

45. (Cancelled.)

1 46. (Original) A method of MIG welding
2 comprising:

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3 providing ac power to a weld, wherein the ac power
4 has a negative portion and a positive portion, and the ac
5 power further has a frequency;

6 wherein the negative portion has a negative amp-
7 seconds and the positive portion has a positive amp-seconds,
8 and further wherein the magnitude of the negative amp-
9 seconds is greater than the magnitude of the positive amp-
10 seconds; and

11 wherein the frequency is at least 60 Hz.

1 47. (Original) The method of Claim 46, further
2 comprising providing a wire comprising a sheath encapsulating a
3 core having a core composition, the core composition comprising a
4 combination of graphite and one or more compounds of potassium,
5 the combination of graphite and compounds of potassium in the
6 core composition not exceeding approximately 5% by weight.

1 48. (Original) The method of Claim 47, wherein
2 providing the wire includes providing the wire electrode wherein
3 the one or more compounds of potassium comprise K_2MnTiO_4 , and the
4 combination is selected from the range from about 0.3% to about
5 5.0% by weight.

1 49. (Original) A MIG welding system
2 comprising:

3 power means for providing ac power to a weld,
4 wherein the ac power has a negative portion and a positive
5 portion, and the ac power further has a frequency; and

6 control means for controlling the power means,
7 wherein the negative portion has a negative amp-seconds and
8 the positive portion has a positive amp-seconds, wherein the
9 control means causes the negative amp-seconds to be greater

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10 than the positive amp-seconds, and wherein the frequency is
11 at least 60 Hz.

1 50. (Original) The system of claim 49, wherein the
2 control means includes means for providing the frequency to be
3 between 90 Hz and 120 Hz.

1 51. (Original) The system of claim 49, further
2 including a consumable, flux-cored, wire, disposed to be provided
3 to the weld.

1 52. (Original) The system of claim 51, wherein the
2 wire is metal-cored.

1 53. (Original) The system of claim 52, further
2 comprising a weld path on at least one work piece, wherein the
3 weld path includes a groove having an angle of less than 50
4 degrees.

1 54. (Original) The system of claim 49, further
2 comprising a weld path on at least one workpiece, wherein the
3 weld path includes a groove having an angle of less than 30
4 degrees.

1 55. (Original) The system of claim 54 wherein the
2 control means for includes means for causing the negative amp-
3 seconds to be at least twice the positive amp-seconds.

1 56. (Original) The system of claim 49 wherein the
2 control means includes means for causing the negative amp-seconds
3 to be at least 1.5 times the positive amp-seconds.

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1 57. (Original) The system of claim 56 wherein the
2 control means includes means for causing the weld process to
3 begin with a first negative portion having a duration of at least
4 0.5 seconds.

1 58. (Original) The system of claim 49 wherein the
2 control means includes means for causing the weld process to
3 begin with a first cycle portion having a duration of at least
4 0.75 seconds.

1 59. (Currently Amended) A system of MIG welding
2 arc comprising:

3 power means for providing to a weld ac power
4 having a negative portion and a positive portion, and the ac
5 power further having a frequency between 30 Hz and 120Hz;
6 and

7 means for providing a consumable, cored, wire to
8 the weld.

1 60. (Original) The system of claim 59 wherein the
2 power means includes means for beginning the weld process with a
3 first negative portion having a duration of at least 0.5 seconds.

1 61. (Currently Amended) A system of MIG welding
2 comprising:

3 power means for providing ac power to a weld, the
4 ac power having a negative portion and a positive portion,
5 and the ac power further having a frequency between 30 Hz
6 and 120Hz; and

7 means for controlling the power means such that
8 the negative portion is at least 1.5 times the positive
9 portion.

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10 62. (Original) The system of claim 59 further
11 comprising means for controlling the power means such that the
12 weld process begins with a first negative portion having a
13 duration of at least 0.5 seconds.

1 63. (Currently Amended) A system of MIG welding
2 comprising:

3 power means for providing ac power to a weld,
4 wherein the ac power has a negative portion and a positive
5 portion, and further has a frequency between 30 Hz and
6 120Hz;

7 control means for controlling the power means such
8 that the negative portion is greater than the positive
9 portion, and further such that the weld process begins with
10 the negative portion for at least 0.5 seconds.

1 64. (Original) A system of MIG welding
2 comprising:

3 power means for providing ac power to a weld,
4 wherein the ac power has a negative portion and a positive
5 portion, and further has a frequency;

6 control means for controlling the power means such
7 that the negative portion has a negative amp-seconds and the
8 positive portion has a positive amp-seconds, and further
9 wherein the magnitude of the negative amp-seconds is greater
10 than the magnitude of the positive amp-seconds.

65-78. (Cancelled.)

1 79. (Currently Amended) A system of MIG welding
2 comprising:

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3 an ac power source having a control input and a
4 MIG output, wherein the MIG output has a negative portion
5 and a positive portion;

6 a controller, including a balance circuit and a
7 feedback circuit, operatively connected to the control input
8 such that the negative portion is at least 1.5 times the
9 positive portion, and the MIG output has a frequency of
10 between 30 Hz and 120 Hz.

1 80. (Original) A method of controlling
2 dilution in MIG welding comprising:

3 providing ac power to a weld, wherein the ac power
4 has a negative portion and a positive portion, and the ac
5 power further has a frequency;

6 controlling the balance of the negative portion
7 and the positive portion to obtain a desired dilution.

1 81. (Original) The method of claim 80 wherein the
2 negative portion is greater than the positive portion.

1 82. (Original) The method of claim 80 wherein the
2 negative portion is less than the positive portion.